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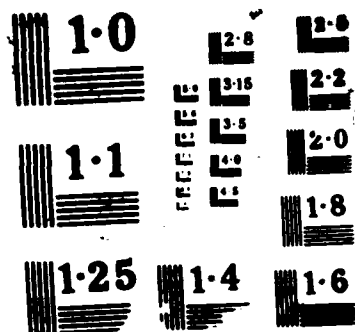   H B DAHMS 17 FEB 87

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Prototype information centers were studied to recommend strategies for implementing information cneters at US Army installations/ activities. Regional information centers can provide cost-effective consultative assistance to installation information centers.

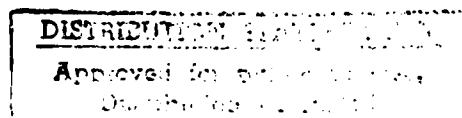**DD** ᶠᵒᴿᴹ **1473** EDITION OF 1 NOV 65 IS OBSOLETE
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HEADQUARTERS
U.S. ARMY INFORMATION SYSTEMS COMMAND

Fort Huachuca, Arizona 85613-5000

COST/BENEFIT ANALYSIS OF PROTOTYPE INFORMATION
CENTERS

REPORT NUMBER: SA - 245-87

REPORT DATE: 8 JAN 87

Prepared by

SYSTEMS & ECONOMIC ANALYSIS DIVISION

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COST/BENEFIT ANALYSIS OF PROTOTYPE
INFORMATION CENTERS

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DISCLAIMER

EXECUTIVE SUMMMARY

1. The Army adopted the information center (IC) concept as the channel for providing expert technical support for end-users of microcomputers. To provide recommended strategies for implementing these ICs, six prototype existing ICs were evaluated in the period March through October 1986. Each IC provided essential services for its installation although the scope of and approach to these functions varied significantly from station to station. Also, the user populations differed widely with respect to number and maturity with representative ICs from TRADOC, FORSCOM, TECOM, and AMC. This study organizes the findings from this cross section of ICs into three technical support areas: hardware/software acquisition and maintenance support, training, and operational support to the end-users. The analysis of the data obtained provides useful measurement parameters for estimating purposes and a range of implementation approaches that enable a benefits comparison.

2. It is apparent that ICs should be tailored to the needs of the installation and to the maturity of the end-users. Furthermore, the IC staff can satisfy the user requirements in a cost effective manner by judicious delegation and referral practices including:

a. Delegation of specialized and part-time workload to locally available experts. For example, as the training demand increases and diversifies, the training department is enlisted to develop courses and sponsor programs, vendor supplied materials and tutorials are distributed, and one-on-one training is given by specially prepared computer coordinators assigned by the user organizations who also serve to answer questions and solve problems.

b. Referral of technical matters and advanced training to outside agencies. For example, when hardware and peripherals are to be acquired, the IC could request expertise to provide assistance from a regional IC or from the General Purpose Computer Support Center (GPCSC). These same sources could offer support for solving difficult problems or developing networks and applications. The regional IC can also hold seminars to indoctrinate management personnel and train key individuals in advanced subjects.

COST/BENEFIT ANALYSIS OF PROTOTYPE INFORMATION CENTERS

1. OBJECTIVE. To evaluate alternative approaches that an information center (IC) can use for performing the following microcomputer-user support functions based upon information obtained from prototype ICs, and then to project how these IC functions might be shared with a regional IC (RIC) to effect economies:

    a. Acquisition of microcomputer hardware and software.

    b. Training microcomputer users and indoctrinating management.

    c. Supporting microcomputer operations as regards user applications, establishing systems and networks for the users, adopting new technology, and solving user problems.

2. BACKGROUND. Six prototype model CONUS installations with operating information centers (ICs) were studied during the period March-October 1986 to provide guidance for implementing ICs in the Army. The ICs were located at Fort Stewart, GA, Fort Monroe VA, Fort Ord, CA, Rock Island Arsenal, IL, Fort Hood, TX, and White Sands Missile Range, NM. One of the purposes of the survey was to collect information for this economic cost/benefit analysis. Each post, camp, base, or station must have an IC to provide expert service to all users of microcomputers. The composition of the IC is not specified. The resources to support the IC are a local responsibility. The implementation of the ICs at the six prototype sites afford a variety of approaches that have met the needs of a range of user populations and maturity. Conclusions and recommendations drawn from their experience may enable a more cost-effective implementation of ICs at the Army installations.

3. CONSTRAINTS AND SCOPE

    a. The study included only six ICs. The findings of this study presumably will influence decisions affecting 220 ICs located all over the world. There is no way to judge if these six sites constitute an accurate cross section of the rest of the Army sites.

    b. The six ICs were developed without benefit of ground rules other than that the ICs should provide a point of contact for all matters relating to third tier automated office systems. Each IC reflects the vision and aggressiveness of the local proponent; consequently, there is very little uniformity among the sites with respect to the organization of the IC and the services offered by the IC to microcomputer users.

4. ASSUMPTIONS:

    a. The six sites do provide, to a greater or lesser degree, all of the essential services expected of an IC either by the IC itself, or by delegation

to other specialists resident at the installation, or by referral to other sources, such as a contractor, or experts from another IC. These services include:

(1) Provide a single point of contact for microcomputer users.

(2) Provide training opportunities and reference materials so that users will be prepared to get the most from their equipment and software in performing their assignments.

(3) Provide assistance in defining user requirements for acquisition of hardware and software and for evaluating, installing, and maintaining it upon receipt.

(4) Provide guidance in solving problems and developing computer systems and networks for operational support of the users.

b. ICs are not static organizations. They must change to satisfy the maturing needs of the microcomputer users.

c. Appendix A lists the grade or rank of the personnel who were assigned to each of the six ICs during October 1986. The pay rates used are as listed in ASP 11-2, in the absence of actual manpower costs. The overall average annual cost per person for the IC staffs is $39.46K using these pay rates. To facilitate computations, this study applies a factor of $40K per person.

d. The spread of IC manpower among the four principal IC functions is shown in appendix A. The values were developed from a combination of data from the final report draft, 3 November 1986 prepared by the Information Systems & Networks Corporation, documentation sent to this office from the sites, and by direct contact, visits, and telephone conversations with the management and staff of the six ICs.

e. The approximate number of microcomputer systems available to users and an estimated number of users at each IC were used in this study due to the transitory nature of this information. Gross estimates were provided by the ICs.

f. Only those costs that impact the IC organization were used in this study. Users expense from training budgets, general maintenance contracts, and user personnel that perform IC tasks were not readily available but must be accounted for when establishing the total Army costs.

5. METHODOLOGY:

a. A cost/benefit analysis is developed for the alternatives that can be used to accomplish the following IC functions:

(1) Support in the acquisition, evaluation, and installation of microcomputer hardware and software. Alternatives are listed in appendix R.

(2) Support for basic and advanced training of microcomputer users and indoctrination of management in the capabilities of and controls required for automated office equipment. Alternatives are listed in appendix B.

(3) Support for microcomputer operations, applications and networking among systems and between microcomputers and mainframes. Alternatives are listed in Appendix B.

b. Minimum cost to the IC is a primary consideration. Costs of operating an IC can be reduced by any of the following options, or combinations thereof, provided that the IC retains the ultimate responsibility for essential services:

(1) Contracting using installation or user budgets.

(2) Delegating services to specialists within the user organizations, where specially trained or qualified persons are present for problemsolving, answering questions, developing applications for the activity, and conducting one-on-one training of personnel.

(3) Referring the issue to others who are not part of the IC, such as experts within the data processing installation (DPI).

c. A hypothetical regional IC is created to examine the possible roles for an RIC.

(1) The six prototype ICs are used as typical installations to be served by an RIC.

(2) Estimates are used to evaluate the impact that this RIC might be expected to have on the overall Army support for end-users of microcomputers.

(3) The study does not limit itself to the functions listed in the Program Development Increment Package (PDIP) No. A38L (revised August 1985); namely, the Director of Information Management (DOIM) at the Army installation calls upon the regional centers to provide centralized technical training on new equipment and configurations, to conduct demonstrations, and to acquire new products and peripheral enhancements. This emphasis on introducing new technology is designed to ensure that all equipment is compatible with information architecture. In this study, the RIC also offers facilities and expertise for the current installation operations, including training, interchange of information, guidance for developing applications, and resolving technical problems beyond the capability of the installation IC.

6. FINDINGS AND CONCLUSIONS:

a. Acquisition of microcomputer hardware and software:

(1) All six ICs participated in the acquisition process. This action was found to be necessary when items received without benefit of the IC review proved to be unsatisfactory, even worthless. Careful specification of

requirements that are consistent with the user needs has enabled the acquisition of proper equipment. Where the IC review is circumvented, the IC applies a low priority of support and in some cases declines to service the equipment because of unfamiliarity with it.

(2) Upon receipt of microcomputer assets, the IC usually performs an evaluation to confirm that the items meet the procurement requirements. Some ICs install the equipment at the user's facility and demonstrate its operation.

(3) Maintenance and repair usually is contracted. Rock Island Arsenal sent its equipment to a local Army activity. Fort Stewart and Fort Ord contracted this work on a case-by-case basis. The other ICs used installation contract services. The ICs did not incur costs for this support.

(4) Each IC maintained some form of microcomputer asset inventory control. These records were adapted to serve IC interests. For example, Fort Ord placed identification stickers on hardware that referenced the telephone number to call in event of trouble. Fort Stewart and Fort Ord used these records to try in tracking problems and answering questions.

(5) Appendix C summarizes the IC functions at each of the six ICs and provides a benefits analysis for the various kinds of support that an IC might offer. The ICs have an average of one person involved in hardware and software support for every 192 microcomputers in the user activities.

b. Training. Training and indoctrination of microcomputer users and management personnel is an ongoing responsibility of the IC. Novices are introduced to the basics of the hardware and software and then need advanced instruction to be able to obtain greater proficiency in utilizing the full potential of the system. Management should be aware of the latest advances in this expanding technology to plan, administer, and control these resources. The IC staff at each of the six prototype ICs participated in the training functions.

(1) Fort Stewart. Each trainee received 4 hours of one-to-one instruction before the person was allowed to use a computer. Group training was provided for software instruction. Vendor manuals and computer-based tutorials were available. Also, the CPO offered a 40-hour training course.

(2) Fort Ord. Two trainers were on the IC staff. Each worked half the time as instructors and the other half as consultants for problemsolving and operational questions. The IC had a training facility equipped with newlyarrived and borrowed microcomputers. The alternative of using contracted trainers was abandoned when it became apparent that it would cost at least $750/student for the same training that the staff provided at a cost of about $44/student. The administrative matters associated with training are done by the Fort Ord training branch. Classroom instruction topics are available to the users in tutorials.

(3) Fort Hood. Each trainee receives 4 hours of training after the trainee has completed a tutorial phase of instruction. The local college

offers courses that are arranged through the CPO with subjectmatter that was developed by the IC. On-the-job training materials are provided by microcomputer vendors. Emphasis is also given in the area of management indoctrination.

(4) Rock Island Arsenal. The IC directs the training program but does not actually perform the instruction. Introductory courses are contracted to the local schools. Advanced courses are arranged through the Chicago office of personnel management who provide the courses at Rock Island. Computer coordinators within the activities provide one-to-one training opportunities. Vendor-supplied tutorials are also available.

(5) Fort Monroe. The IC arranges for the particular training each candidate should have. Five trainers are contracted by the IC to do the training. The training department takes care of all the details connected with the microcomputer training courses. The IC maintains a demonstration facility that individuals may use for individual indoctrination and support.

(6) White Sands Missile Range. The IC oversees the training operations but does not become directly involved in them. The training department provides classroom space and handles the administrative functions. Instructors are provided by the Computer Systems Directorate.

(7) Appendix D summaries the advantages and disadvantages of the various approaches for satisfying the training functions and displays the training approaches used at each of the six prototype ICs and the resultant costs per student per class. The 0.5 manpower level of effort that the ICs are able to maintain results primarily from the successful delegation of training responsibilities to others.

c. Microcomputer operations. Each of the six prototype ICs provided a point of contact that the microcomputer users could call. The manner that each ICs responds is described below.

(1) For issues beyond the expertise of the local IC, call in support from another IC. The prototype ICs provided support to other ICs. In doing so, they assumed the role of RICs. For example, White Sands routinely sent personnel to help other proving ground facilities, as well as nearby stations including Yuma, PG, Dugway PG, Holloman AFB, and Fort Huachuca. The Rock Island Arsenal provided guidance to the arsenals at Longhorn, Crane, and Hawthorne. Fort Ord supported the Presidio at Monterey and the Hunter-Liggett operations. Fort Monroe worked with Fort Eustis and Fort Story. Even Fort Stewart was assisting an Air Force field located in its vicinity with micro-computer operations.

(2) The ICs tried to cover all activities at their installations. In some cases the activities at the site provided their own IC functions, such as the tactical units at Fort Hood, Fort Ord, and Fort Stewart. At White Sands, some very large projects provided all their own support. Where an activity acquired hardware that was not familiar to the IC staff, the IC provided support only at a low priority.

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(3) At Fort Hood and Rock Island Arsenal, user communities provided their own local specialist for handling microcomputer problems, training, and applications. The IC tapped the expertise of these specialists on occasion.

(4) At White Sands MR the Computer Systems Directorate (CSD) provided support to the three major microcomputer activities: engineering, scientific, and business organizations.

(5) The DPI was observed to be supportive at all of the prototype ICs. The DPI provided continuous backup support to the ICs at Fort Stewart, Fort Ord, and at Rock Island Arsenal.

(6) The six prototype ICs did not solicit support from other sources. It appeared each believed that if they had to call for help that they weren't doing their job.

(7) Appendix D shows the operational support provided to microcomputer users. It shows that an IC that performs most of the user support, as was the case for Fort Ord and for Fort Monroe, approximately 18 hours per user per year is a good estimate. Fort Hood has supplementary ICs to cover its workload which accounts for the lower support figure of 10 hours per user per year. As noted, Rock Island delegates the support to activities. The Fort Stewart IC hours per user per year is indicative of the need for more staff.

(8) Appendix D also summarizes the operational support alternatives and their advantages and disadvantages. The relative costs for training classes using estimates derived in appendix D-3 are tabulated below. The costs include the trainers time and travel expenses for a week of instruction, and the travel expenses of 10 students if the classes are not held at the IC. Various class frequencies are indicated to provide insight into the costs involved for the various class arrangements.

Class held At	By	Each Class	One class per year	12 classes per year	24 classes per year
IC	IC	527.70	27,442	27,442	27,442
IC	RIC	1,526.10	1,526	18,313	36,626
RIC	RIC	6,231.10	6,231	74,773	149,546
IC	Contr	2,000.00	104.000	104,000	104,000
IC	OPM	3,825.00	3,825	45,900	91,800
OPM	OPM	11,250.00	11,250	135,000	270,000
Vendor	Vendor	18,150.00	18,150	217,800	-------

(a) For installations that have 18 or less classes per year, it is more cost effective to have a trainer come to the installation for classes than to keep a trainer on the IC staff.

(b) It can be shown that it is less expensive to have a representative come to the RIC for a week of instruction than for the RIC trainer to travel to each of the six IC installations to conduct classes or to hold any other meeting.

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d. RIC operations:

(1) Microcomputer hardware and software support. After the installation IC has compiled the needs of the user organization, the RIC can provide follow-up with procurement to obtain economies that might not otherwise occur by coordination with other procurement requests. Technical advantages also are realized because the RIC can prescribe the procurement that anticipates the involvement of new information architecture and is able to plan for its integration and compatibility.

(2) Training. The RIC can provide training opportunities that augment the installation IC training program, particularly in the advanced subjects and for management indoctrination. Key personnel from the installations can meet periodically at a common site for these seminars. The RIC should be able to arrange for authorities and vendors that an individual IC could not attract. The RIC can be the author of self-help materials, computer tutorials, and newsletters. It can maintain a demonstration area to showcase hardware and software and as an adjunct can have a technical library, catalogs, and cost information. Instructors can be provided from the regional IC to travel to nearby installations as the need arises, thus making it unnecessary for the local installation IC to staff for this sporadic need.

e. IC manpower requirements:

(1) The prototype ICs would be staffed as noted below if the relationships computed in this study were applied to them:

Function	Note	Fort Stwt	Fort Ord	Fort Hood	Rock Isld	Fort Mnro	White Sands
Administration		0.1	1.5	4.0	2.0	3.0	1.0
HW/SW support	1	0.6	1.5	1.3	3.0	2.5	0
Training	2	0.5	0.5	0.5	0.5	0.5	0
Ops support	3	0.8	1.6	2.4	10.0	2.8	0
Totals		2.0	5.1	8.2	15.5	8.8	1.0
Current staff		2.0	7.0	11.0	11.0	14.0	1.0
Variance	4	0	+1.9	+2.8	-4.5	+5.2	0

Notes:
1. Basis: One person per 200 microcomputers.
2. Basis: 0.5 level of effort for all ICs.
3. Basis: 8 hours/user/year
4. Fort Ord and Fort Hood appear high partially because of the training focus currently needed and the support provided to the expanding user populations at these installations. Fort Monroe has a de facto RIC as HQ TRADOC which accounts for the apparent staff surplus. Rock Island Arsenal is able to operate below the norm because of its practice of delegating user support to the user organizations.

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(2) A recent issue of Government Computer News (29 Aug 86) suggests using a ratio of 20 microcomputers per IC staff member. Five prototype ICs that have a staff (omits White Sands) yield a ratio of 40 microcomputers per IC staff member. Therefore, if the suggested IC staffing formula were to be used, the Army IC staffs would double.

7. RECOMMENDATIONS:

a. Acquisition of microcomputer hardware and software:

(1) The IC staff should work with the microcomputer-user organization to translate their hardware/software requirements into the work statement to ensure that the products received are compatible with overall Army planning. Furthermore, all microcomputer equipment procurement should be subject to IC review and approval prior to release. Other followup tasks that some of the prototype ICs routinely perform should be curtailed or continued only for special circumstances. This preference for alternative 2 (appendix B, table B-1) is selected for reasons noted below.

(2) The IC should coordinate all procurement plans with the RIC to obtain cost savings through Armywide procurement and to make certain that the equipment is compatible with overall Army information architecture.

(3) The IC does not need to actually prepare the procurement documentation. A review and approval function should suffice.

(4) The IC does not need to checkout, install, or demonstrate the equipment upon receipt. If problems emerge, these can be dealt with as necessary.

(5) The IC should monitor the repair and maintenance of microcomputer equipment to track problem symptoms and corrective action. Contracting and budgeting maintenance should not be done by the IC.

(6) The IC does not have to maintain the property control of microcomputer assets; however, it should try to use this information in its operational support functions.

(7) If the IC is able to provide adequate hardware and software equipment support with about half of the staff assigned to this area when the recommendations of paragraphs 7a(3) through 7a(6) are adopted, which appears to be a reasonable assumption, then about five spaces are saved among the six prototype ICs. The RIC should be able to perform the support for this area with less than five spaces to effect a net savings for the Army.

b. Training:

(1) As a minimum, the IC should direct the kind of subjectmatter that is to be covered in the training program.

(2) Each of the alternatives indicated in appendix B table B-2, has merit. The particular approach to training is related to the training workload and the

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maturity of the students. A strategy must be developed to obtain cost advantages consistent with the installation circumstances. For basic instruction, the local IC staff or a specialist within the microcomputer-user organization can provide the necessary guidance augmented with self-help materials and tutorials.

(3) For sporadic formal training requiring 18 or less week-long classes, an instructor from the RIC is less costly than providing a trainer from the IC. For a steady flow of classes, the IC should consider delegating the training program in anticipation of the time when the training phase declines. As the need for advanced training arises, the RIC should be able to provide the appropriate expertise.

(4) The ICs should work with the microcomputer end-user organizations to institute computer coordinators who can serve as a communications link to the IC and as the resident computer specialist.

c. Microcomputer operational support. Alternatives 1, 3, and 4 of appendix B, table B-3, should be applied together. For prompt support to user questions, the resident specialist provides the best support. For issues beyond his expertise, the IC can be consulted. In like manner, the RIC is available for support to the IC.

d. RIC Utilization:

(1) The overall cost of providing expert support to microcomputer users can be reduced by implementing RICs. This savings results from the finding that one RIC specialist can cover operations at several installations to relieve the installations from having to provide manpower for the part time effort. The RIC is particularly well suited for functions related to microcomputer hardware and software acquisition, applications, networking, and problemsolving. Also, the RIC saves by augmenting the IC training and indoctrination efforts.

(2) Information management decisions are required for the implemention of the RICs. RICs can be designated to support geographical areas, command responsiblities (for example, TRADOC operations, arsenals, tactical applications, etc.), and technical areas (GPCSC), or combinations thereof.

Grade/rank of prototype IC staff members.

Grade Rank	Fort Stewart	Fort Ord	Fort Hood	Rock Island	Fort Monroe	White Sands
GS-14				1		
GS-13				1	1	1
GS-12			1	4	3	
GS-11	1	1	4	3	3	
GS-10						
GS-09		2		1	1	
GS-08						
GS-07	1	3	2	1	1	
GS-06			2		1	
GS-05					1	
GS-04					1	
GS-03					1	
O-3			2			
W-?		1				
Student					1	
Totals	2	7	11	11	14	1
$K/year*	68	241	422	504	522	58
Average $K/year /Person	34	34	38	46	37	

*   Salary rates are based upon ASP 11-2.

Assignments of prototype IC staff personnel.

Task	Fort Stewart	Fort Ord	Fort Hood	Rock Island	Fort Monroe	White Sands
Admin	.1	1.5	4.0	2.0	3.0	1.0
HW/SW	.5	1.0	2.0	3.0	4.0	
TNG	1.0	1.0	2.0	0.5	0.5	
OPS	.4	3.5	3.0	5.5	6.5	
Totals	2	7	11	11	14	1

Appendix B: Alternatives for Installation IC Functions.

Table B-1:   Microcomputer hardware and software acquisition alternatives.

Alternative 1:   The IC staff works with the users to translate their
                    requirements into the procurement work statement in order
                    ensure that the products received are compatible with
                    overall planning. Upon receipt, the IC staff checks it
                    out and installs it at the user's location.

Alternative 2:   Same as alternative 1 except that the contractors who
                    supply the product or others install the product and
                    demonstrate its compliance with the requirements of the
                    purchase order.

Alternative 3:   The user organization obtains the microcomputer asset on its
                    own, perhaps using standards adopted by the Army, or on the
                    recommendation from some source outside of the installation,
                    such as the General Purpose Computer Support Center (GPCSC).

Table B-2:   Microcomputer training alternatives.

Alternative 1:   The IC staff does the actual instruction although the
                    administration of the program, such as surveying the
                    installation for trainees, furnishing the classrooms and
                    facilities, and maintaining records, may be done by the
                    training department.

Alternative 2:   Contracted instructors do the instruction with payment from
                    the IC budget.

Alternative 3:   The training department sponsors the training and arranges
                    for the instructors, school courses, and contractors. The
                    IC may or may not have an active role in the training
                    subjectmatter.

Alternative 4:   Self-help materials and tutorials are used to train
                    personnel. A trainee may obtain one-on-one instruction from
                    the IC demonstration facility or others in his organization.

Alternative 5:   The user activity may arrange for vendor demonstrations, or
                    members of the data processing installation or others not
                    associated with the IC, to provide training that the
                    activity deems appropriate.

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Table B-3: Microcomputer operational support alternatives.

Alternative 1:   The IC staff provides the support, including problem
                  solving, consultative assistance, and other support
                  services.

Alternative 2:   The IC staff serves as a point of contact. Contract
                  personnel provide user support on an as-required basis.

Alternative 3:   The IC staff serves as a point of contact. Experts from
                  the DOIM or other Army personnel are called in on an as-
                  required basis.

Alternative 4:   Microcomputer specialists within the user activity provide
                  direct support to others within the activity. When
                  confronted with issues beyond their expertise, the IC is
                  contacted.

Appendix C: Microcomputer Hardware and Software.

Table C-1: Prototype IC microcomputer hardware and software support.

	Fort Stewart	Fort Ord	Fort Hood	Rock Island	Fort Monroe	White Sands	
Define requirements	X	X	X	X	X	X	
Prepare purchase order					X		
Checkout equip received	X	X	X	X	X		
Install equip received	X	X	X		X		
Demonstrate equip received	X	X					
Arrange repair of eqmt	X	X		X			
Have maint contract			X		X		
Keep inventory controls	X	X	X	X	X		
IC manpower level for task	.5	1.0	1.0	3.0	4.0	.8	10.3
Microcomputers at site	125	300	250	600	500	200	1975
Microcomputers/IC staff	250	300	250	200	125	250	192

Table C-2: Benefits analysis.

IC staff function	IC Provides	IC Doesn't provide
Define requirements for procurement of microcomputer hardware and software.	Proper and compatible equipment that the IC is able to service is obtained.	Operational needs may not be satisfied.
Prepare purchase order for equipt.	Expedites delivery.	Saves IC effort.
Checkout equipment before delivery to user activity.	Confirms compliance with requirements.	Deficient equipment is eventually found and corrected.
Install equipment for user.	Obtain proper setup.	IC is on call if there are problems.
Arrange for repairs.	Reliable and timely corrective maintenance sources can be used.	User activity can control its own assets.
Keep inventory file.	IC can incorporate data useful to IC support functions.	Saves IC effort.

Appendix D: Training.

Table D-1: Training alternatives advantages and disadvantages.

	Advantages	Disadvantages
Use IC staff trainers for instruction.	Trainer can follow-up as a problem solver in support of user operations.	Trainers may not be able to to have expertise in the user's hardware or software.
IC contracts trainers to cover material that IC establishes.	Can cover full range of hardware and software and advanced topics.	Cost/student/class is high.
Training department sponsors courses.	Same as above. Can work with local schools to develop courses. No IC organization expenses.	Costs same as above. TDY expense may also be incurred.
Training is provided through tutorials and self-help materials.	Minimum cost.	Comprehension of topics is limited by the trainee's initiative.
User activities have microcomputer specialists to do some training.	One-on-one training for trainees. Costs are absorbed in the user's budgets.	Expertise is limited to user activities.

Table D-2: Prototype IC training approaches.

	Fort Stewart	Fort Ord	Fort Hood	Rock Island	Fort Monroe	White Sands
Use IC staff trainers	X	X	X			
Use IC-contracted trainers					X	
Training dept sponsored	X	X	X	X	X	X
Self-help materials	X	X	X	X		
Use specialists in activity	X			X	X	
Est cost/student/class ($)	78	44	78	90	743	?
IC manpower level for task	1.0	1.0	2.0	0.5	0.5	0

Table D-3: Training Costs.

Configuration: The model RIC serves the six prototype ICs. The average distance from the RIC to the ICs is 300 miles, per diem is $75/day, round trip transportation is based on $0.20/mile, and automobile rental is $50/day.

Relative costs to the Army for a trainer to conduct a week of instruction for 10 students are computed as follows for various options:

a. Class held at the IC by a GS-09 Trainer:

   Trainer salary for a week: $27,442/52 weeks $527.70

b. Class held at the IC by a GS-11 Trainer from the RIC:

   Trainer salary for a week: $40,615/52 weeks $ 781.10
   Per Diem: $75/day x 5 days   375.00
   Transportation: RT 600 miles x $0.20/mile   120.00
   Auto rental: $50/day x 5 days   250.00
                     Total cost $1,526.10

c. Class held at the RIC by a GS-11 Trainer from the RIC:

   Trainer salary for a week: $40,615/52 weeks $ 781.10
   Per Diem: $75/day x 5 days x 10 students   3,750.00
   Transportation: RT 600 miles x $0.20/mile x 10
   students   1,200.00
   Auto rental: $50/day x 5 days x 2 autos   500.00
                     Total cost $6,231.10

d. Class held at the IC by a contractor as at Fort Monroe:

   $520,000/year for 5 instructors/52 weeks/5 $2,000.00

e. Class held at vendor selected site by vendor (Datapoint flyer):

   Tuition: $990/student $9,900.00
   Per Diem: $75/day x 5 days x 10 students   3,750.00
   Transportation: RT 1,000 miles x $0.20/mi x 6
   students   1,200.00
   Auto Rental: $50/day x 5 days x 6 autos $1,500.00
                     Total cost $16,350.00

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f. Class held at OPM selected site by OPM:

Tuition: $300/student x 10 students	$ 3,000.00
Per diem, transportation, and auto rental as above	7,250.00
Total cost	$10,250.00

g. Class held at IC by OPM:

Tuition: $300/student x 10 students	$ 3,000.00
Per Diem $75/day x 5 days	375.00
Transportation: RT 1000 miles x $0.20/mi	200.00
Auto rental: $50/day x 5 days	250.00
Total cost	$ 3,825.00

Appendix E: Operational Support.

Table E-1: Prototype IC operational support approaches.

	Fort Stewart	Fort Ord	Fort Hood	Rock Island	Fort Monroe	White Sands
Use IC staff for support	X	X	X	X	X	
Contract for user support	Support offered to cover equipment warrantees					
Activity specialist or supplementary IC used	X	X	X	X*	X	
Installation DPI also available for backup	X	X		X		X
IC manpower level for task	.4	3.5	3.0	5.6	6.5	0
Microcomputer users	200	400	600	2500	700	200
IC hours/user/year	4	18	10	4*	18	-

*Rock Island has computer coordinators that provide the majority of operational support to the activities with a large number of microcomputer users.

Table E-2: Microcomputer operational support alternatives advantages and Disadvantages.

	Advantages	Disadvantages
Use IC staff for all support.	IC cognizant of all aspects of microcomputer operations at site.	IC must have enough staff to provide prompt and effective support.
Use contractor for user support.	Reduces IC staff and cost.	Delayed response to user questions and problems.
Rely on DPI or the ICs at other sites.	Reduces IC staff and cost. Adequate for small stations.	Requires cooperation and priorities from sources to get prompt action.
Have specialists in activity provide supplementary support.	Prompt response to most users problems. No IC costs for this service.	Possible loss of visibility for IC. User expertise may be limited.

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END

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